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THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF Viable BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN, FIELD

'PH21T'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twelfth day of September, in the year two thousand one.

Attest:

Paul M. Johnson

W. H. Johnson

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

l Agn
Wilson et al.
App. No. 10/768,407

REF
A7

REPRODUCE LOCALLY. Include form number and date on all reproductions.

FORM APPROVED - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY DIVISION - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate)

Pioneer Hi-Bred International, Inc.

4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)

Research and Product Development
P.O. Box 85
Johnston, IA 50131-0085

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

3. VARIETY NAME

PH21T

5. TELEPHONE (include area code)

515/270-4051

FOR OFFICIAL USE ONLY

PVPO NUMBER

9800354

6. FAX (include area code)

515/253-2125

FILING

DATE

8/10/1998

FILING AND EXAMINATION FEE:

\$ 2450.00

DATE

8-5-98

CERTIFICATION FEE:

\$ 320.00

DATE 9/10/2001

7. GENUS AND SPECIES NAME

Zea Mays

8. FAMILY NAME (Botanical)

Gramineae

14. TELEPHONE (include area code)

515/270-4051

15. FAX (Include area code)

515/253-2125

9. CROP KIND NAME (Common name)

Corn

10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) (Common name)

Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

Iowa

12. DATE OF INCORPORATION

May 6, 1926

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Steven R. Anderson
Research and Product Development
P.O. Box 85
Johnston, IA 50131-0085

16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

- a. Exhibit A. Origin and Breeding History of the Variety
- b. Exhibit B. Statement of Distinctness
- c. Exhibit C. Objective Description of the Variety
- d. Exhibit D. Additional Description of the Variety (Optional)
- e. Exhibit E. Statement of the Basis of the Applicant's Ownership
- f. Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in an approved public repository)
- g. Filing and Examination Fee (\$2,450), made payable to "Treasury of the United States" (Mail to PVPO)

17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act)

YES (If "yes," answer items 18 and 19 below) NO (If "no," go to item 20)

18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

YES NO

19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

FOUNDATION REGISTERED CERTIFIED

20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?

YES (If "yes," give names of countries and dates) NO

21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT (Owner(s))

SIGNATURE OF APPLICANT (Owner(s))

Steven R. Anderson

NAME (Please print or type)

NAME (Please print or type)

Steven R. Anderson

CAPACITY OR TITLE

CAPACITY OR TITLE

DATE

DATE

Senior Research
Associate

7/29/98

INSTRUCTIONS

98-3354

GENERAL: To be effectively filed with the Plant Variety protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) completed application form signed by the owner; (2) completed Exhibits A,B,C,E; (3) at least 2,500 viable untreated seeds, or for tuber reproduced repository; (4) check drawn on a U.S. bank for \$2,450 (\$300 filing fee and \$2,150 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the *Regulations and Rules of Practice*.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety production Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Blvd., Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$300 for issuance of the Certificate.

Plant Variety Protection Office
Telephone: (301) 504-5518

ITEM

16a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified.

16b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences;
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

16c. Exhibit C forms are available from the PVPO for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

16d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.

16e. Section 52(5) of the Act required applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

17. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant may NOT reverse this affirmative decision after the variety has been sold and so labelled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See *Regulations and Rules of Practice, Section 97.103*.)

20. See sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment is specified in Section 97.175 of the regulations. (See *Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of Regulations and Rules of Practice*.)

To avoid conflict with other variety names in use, the applicant should check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center-East, Beltsville, MD 20705. Telephone: (301) 504-8089.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate of any other aspect of this collection of information, including 0055 and form number in your letter. Under the PRA of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication program information (braille, large print, audiotape, etc.) should contact the USDA Office of Communications at (202) 720-2781. To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C. 20250, or call (202) 720-7327 (voice) or (202) 720-1127 (TDD). USDA is an equal opportunity employer.

Exhibit A. Origin and Breeding History

Pedigree: PHEH5/PHR03)X22223X

Pioneer Line PH21T, Zea mays L., a dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross PHEH5 X PHR03 (PVP Certificate Number 9100097) using the pedigree method of breeding. The progenitors of PH21T are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Variety PHEH5 was derived from a single cross hybrid PHR12 X PHV78 (PVP Certificate Number 8800003) The progenitors are proprietary varieties of Pioneer Hi-Bred International, Inc.. Variety PHR12 was derived from a single cross hybrid PH814 X PH848. The varieties C103, OS420, 38-11, OS426 contributed greatly to the genotype in the derivation of PH814. Varieties SRS303, OH43, OS420, OS426, MINN49, IDT, AR4, I205, SRS303, and LF51 contributed to the genotype in the derivation of PH848. Selfing and selection were practiced within the above F1 cross (PHEH5 X PHR03) for 6 generations in the development of PH21T at Macomb, Illinois. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Macomb, Illinois, as well as other Pioneer research locations,. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations made for uniformity.

PH21T has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed 6 generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PH21T.

The criteria used in the selection of PH21T were kernel texture, yield, both per se and in hybrid combinations; kernel size, especially important in production; ability to germinate in adverse conditions; number of tillers, especially important in production because having numerous tillers increases hybrid production costs spent on detasseling; disease and insect resistance. Hybrids with PH21T as a parent have good gray Leaf Spot tolerance.

545
8/13/01

The line PH21T has been increased both by hand and in isolated fields with continued observations for uniformity and stability throughout development, and for 3 generations during the final stages of inbred development and seed multiplication.

9863354

DEVELOPMENTAL HISTORY FOR PH21T

<u>Season/Year</u>	<u>Inbreeding Level</u>
Winter 1990	F1
Summer 1991	F2#
Summer 1992	F3#*
Summer 1993	F4#*
Summer 1994	F5#*
Winter 1994	F6#*
Summer 1995	F7#*
Winter 1995	F8 Bulk Increase

#PH21T was selfed and selected through F7 generation.

*PH21T was selfed and ear-rowed from F3 through F7 generation.

Exhibit B. Novelty Statement

PH21T mostly resembles Pioneer Hi-Bred International, Inc. proprietary inbred line PHR03 (PVP Certificate No. 9100097). Collectively, the traits in table 1A, 1B and 2 show measurable differences between the two varieties. Variety PH21T (shank length = 11.2 cm) has a shorter shank length than PHR03 (shank length = 15.3 cm). Variety PH21T (stalk diameter = 19.0 mm) has a smaller stalk diameter than PHR03 (stalk diameter = 25.0 mm). Variety PH21T (tassel peduncle length = 22.6 cm) has a longer tassel peduncle length than PHR03 (tassel peduncle length = 17.2 cm) (Table 1A, 1B). Variety PH21T (GDUSHD = 1516) sheds pollen 23 gdu's sooner than PHR03 (GDUSHD = 1539). Variety PH21T (GDUSLK = 1539) reaches 50% silking 39 gdus sooner than PHR03 (GDUSHD = 1578) (Table 2).

For table 1A and 1B a paired t-test was used and the appropriate parameters are given. It is difficult to collect standard deviations for Table 2 due to the way the historical data was stored. For Table 2 a paired comparison was used. The statistical test used was a paired comparison to compare differences between means. These types of comparisons are common in agricultural experiments and should satisfy the criteria and assumptions satisfactorily.

JAS
8/13/01

Exhibit B Novelty Statement Tables

Table 1A. These data indicate differences between varieties PH21T and PHR03. Data are from multiple environments. A t-test was used to compare differences between means. Data is broken out by environments in 1997.

station	loc	year	Trail	Variety	Count	Count	Mean	Mean	Mean	StdDev	StdDev	StdDev	DF	t-Value	Prob (2-tail)	
				1	2	1	2	1	2	1	2	1	2			
AD	20N	1997	shank length (cm)	PH21T	PHR03	5	5	10.8	16.0	-5.2	2.683	2.828	1.200	1.265	8	-2.98 0.018
JH	21	1997	shank length (cm)	PH21T	PHR03	5	5	11.6	14.6	-3.0	2.702	0.894	1.208	0.400	8	-2.36 0.046
AD	20N	1997	stalk diameter (mm)	PH21T	PHR03	5	5	20.0	26.8	-6.8	1.871	3.834	0.837	1.715	8	-3.56 0.007
JH	21	1997	stalk diameter (mm)	PH21T	PHR03	5	5	18.0	23.2	-5.2	2.915	3.347	1.304	1.497	8	-2.62 0.031
AD	20N	1997	tassel peduncle length (cm)	PH21T	PHR03	5	5	24.4	18.4	6.0	2.881	1.817	1.288	0.812	8	3.94 0.004
JH	21	1997	tassel peduncle length (cm)	PH21T	PHR03	5	5	20.8	16.0	4.8	2.168	1.225	0.970	0.548	8	4.31 0.003

Table 1B. Summary data pooled across environments in 1997.

year	Trail	Variety	Count	Count	Mean	Mean	Mean	StdDev	StdDev	StdDev	DF	t-Value	Prob (2-tail)	
			1	2	1	2	1	2	1	2	1			
1997	shank length (cm)	PH21T	PHR03	10	10	11.2	15.3	-4.1	2.573	2.111	0.814	0.667	18	-3.90 0.001
1997	stalk diameter (mm)	PH21T	PHR03	10	10	19.0	25.0	-6.0	2.539	3.887	0.803	1.229	18	-4.09 0.001
1997	tassel peduncle length (cm)	PH21T	PHR03	10	10	22.6	17.2	5.4	3.062	1.932	0.968	0.611	18	4.72 0.000

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Exhibit B Novelty Statement Tables

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Table 2. These data indicate differences between varieties PH21T and PHR03. Data are from multiple locations and years grown primarily in the adapted growing area. Values are for growing degree units to 50% shed (GDUSHD), growing degrees to 50% silking, and Gray Leaf Spot score (GLFSPT).

Variety 1 = PH21T
 Variety 2 = PHR03

YEAR	VAR	GDU		GLF
		SHD	SLK	
		#	ABS	
95	1	1505.0	1533.0	6.5
	2	1531.0	1577.0	4.5
	LOCS	22	22	4
	REPS	22	22	4
	PROB	.010+	.000#	.016+
96	1	1517.0	1531.0	5.8
	2	1534.0	1571.0	4.9
	LOCS	35	34	9
	REPS	35	34	14
	PROB	.075*	.001#	.056*
97	1	1526.0	1558.0	6.0
	2	1555.0	1589.0	4.9
	LOCS	22	22	6
	REPS	22	22	11
	PROB	.002#	.001#	.010+
TOTAL	1	1516.0	1539.0	6.0
SUM	2	1539.0	1578.0	4.8
	LOCS	79	78	19
	REPS	79	78	29
	DIFF	23	39	1.2
	PROB	.000#	.000#	.000#

United States Department of Agriculture, Agricultural Marketing Service
 Science Division, Plant Variety Protection Office
 National Agricultural Library Building, Room 500
 Beltsville, MD 20705

9803354

Objective Description of Variety
 Corn (Zea mays L.)

Name of Applicant (s) Pioneer Hi-Bred International, Inc.	Variety Seed Source	Variety Name or Temporary Designation PH21T																																
Address (Street & No., or RFD No., City, State, ZipCode and Country) 7301 NW 62nd Avenue, P.O. Box 85, Johnston, Iowa 50131-0085		FOR OFFICIAL USE 9803354 PVP0 Number																																
Place the appropriate number that describes the varietal characters typical of this inbred variety in the spaces below. Right justify whole numbers by adding leading zeroes if necessary. Completeness should be striven for to establish an adequate variety description. Traits designated by an '*' are considered necessary for an adequate variety description and must be completed. COLOR CHOICES (Use in conjunction with Munsell color code to describe all color choices: describe #25 and #26 in Comments section): <table> <tr> <td>01=Light Green</td> <td>06=Pale Yellow</td> <td>11=Pink</td> <td>16=Pale Purple</td> <td>21=Buff</td> </tr> <tr> <td>02=Medium Green</td> <td>07=Yellow</td> <td>12=Light Red</td> <td>17=Purple</td> <td>22=Tan</td> </tr> <tr> <td>03=Dark Green</td> <td>08=Yellow Orange</td> <td>13=Cherry Red</td> <td>18=Colorless</td> <td>23=Brown</td> </tr> <tr> <td>04=Very Dark Green</td> <td>09=Salmon</td> <td>14=Red</td> <td>19=White</td> <td>24=Bronze</td> </tr> <tr> <td>05=Green-Yellow</td> <td>10=Pink-Orange</td> <td>15=Red & White</td> <td>20=White Capped</td> <td>25=Variegated (Describe)</td> </tr> <tr> <td colspan="5">26=Other (Describe)</td> </tr> </table>					01=Light Green	06=Pale Yellow	11=Pink	16=Pale Purple	21=Buff	02=Medium Green	07=Yellow	12=Light Red	17=Purple	22=Tan	03=Dark Green	08=Yellow Orange	13=Cherry Red	18=Colorless	23=Brown	04=Very Dark Green	09=Salmon	14=Red	19=White	24=Bronze	05=Green-Yellow	10=Pink-Orange	15=Red & White	20=White Capped	25=Variegated (Describe)	26=Other (Describe)				
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STANDARD INBRED CHOICES (Use the most similar (in background and maturity) of these to make comparisons based on grow-out trial data): Yellow Dent Families: <table> <tr> <td>Family</td> <td>Members</td> <td>Yellow Dent (Unrelated):</td> <td>Sweet Corn:</td> </tr> <tr> <td>B14</td> <td>CM105, A632, B64, B68</td> <td>Co109, ND246,</td> <td>C13, Iowa5125, P39, 2132</td> </tr> <tr> <td>B37</td> <td>B37, B76, H84</td> <td>Oh7, T232,</td> <td></td> </tr> <tr> <td>B73</td> <td>N192, A679, B73, NC268</td> <td>W117, W153R,</td> <td>Popcorn: SG1533, 4722, HP301, HP7211</td> </tr> <tr> <td>C103</td> <td>Mo17, Va102, Va35, A682</td> <td>W18BN</td> <td></td> </tr> <tr> <td>Oh43</td> <td>A619, MS71, H99, Va26</td> <td></td> <td>White Dent: C166, H105, Ky228</td> </tr> <tr> <td>WF9</td> <td>W64A, A554, A654, Pa91</td> <td></td> <td>Pipcorn: Mo15W, Mo16W, Mo24W</td> </tr> </table>					Family	Members	Yellow Dent (Unrelated):	Sweet Corn:	B14	CM105, A632, B64, B68	Co109, ND246,	C13, Iowa5125, P39, 2132	B37	B37, B76, H84	Oh7, T232,		B73	N192, A679, B73, NC268	W117, W153R,	Popcorn: SG1533, 4722, HP301, HP7211	C103	Mo17, Va102, Va35, A682	W18BN		Oh43	A619, MS71, H99, Va26		White Dent: C166, H105, Ky228	WF9	W64A, A554, A654, Pa91		Pipcorn: Mo15W, Mo16W, Mo24W		
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Ceres/wurddsa/doug/98pvp

8

EXHIBIT C: PH21T

1. TYPE: (describe intermediate types in Comments section): 2 1=Sweet 2=Dent 3=Flint 4=Flour 5=Pop 6=Ornamental				Standard Variety Name <u>MO17</u>	
2. REGION WHERE DEVELOPED IN THE U.S.A.: 5 1=Northwest 2=Northcentral 3=Northeast 4=Southeast 5=Southcentral 6=Southwest 7=Other				Standard Seed Source <u>PI 558532</u>	
3. MATURITY (In Region of Best Adaptability; show Heat Unit formula in 'Comments' section) DAYS HEAT UNITS 078 1.443.0 From emergence to 50% of plants in silk 078 1.441.8 From emergence to 50% of plants in pollen 004 0.088.0 From 10% to 90% pollen shed From 50% silk to optimum edible quality 066 1.161.5 From 50% silk to harvest at 25% moisture				DAYS	HEAT UNITS
				077	1.401.0
				076	1.382.3
				004	0.088.5
				069	1.215.5
4. PLANT: 216.3 cm Plant Height (to tassel tip) 086.8 cm Ear Height (to base of top ear node) 016.0 cm Length of Top Ear Internode 0.0 Average Number of Tillers 1.0 Average Number of Ears per Stalk 3 Anthocyanin of Brace Roots: 1=Absent 2=Faint 3=Moderate 4=Dark				Standard Deviation	Sample Size
				223.3	14.22
				095.5	15.59
				017.1	01.42
				0.0	00.01
				1.0	00.00
				1	
5. LEAF: 09.3 cm Width of Ear Node Leaf 79.7 cm Length of Ear Node Leaf 05 Number of leaves above top ear 35 Degrees Leaf Angle (measure from 2nd leaf above ear at anthesis to stalk above leaf) 03 Leaf Color (Munsell code) 5GY34 1 Leaf Sheath Pubescence (Rate on scale from 1=none to 9=like peach fuzz) 5 Marginal Waves (Rate on scale from 1=none to 9=many) 5 Longitudinal Creases (Rate on scale from 1=none to 9=many)				Standard Deviation	Sample Size
				09.0	01.04
				76.2	11.91
				06	00.95
				40	11.27
				03	5GY34
				1	
				6	
				7	
6. TASSEL: 11 Number of Primary Lateral Branches 16 Branch Angle from Central Spike 54.5 cm Tassel Length (from top leaf collar to tassel tip) 8 Pollen Shed (rate on scale from 0=male sterile to 9=heavy shed) 14 Anther Color (Munsell code) 5R34 01 Glume Color (Munsell code) 5GY56 2 Bar Glumes (Glume Bands): 1=Absent 2=Present				Standard Deviation	Sample Size
				07	00.91
				36	08.04
				64.1	02.35
				7	
				01	2.5GY88
				01	5GY58
				1	
Application Variety Data	Page 1			Standard Variety Data	

9800854

Application Variety Data

PH21T

Page 2

Standard Variety Data

7a. EAR (Unhusked Data):

01 Silk Color (3 days after emergence) (Munsell code) 10Y810
02 Fresh Husk Color (25 days after 50% silking) (Munsell code) 5GY68
21 Dry Husk Color (65 days after 50% silking) (Munsell code) 10YR92
2 Position of Ear at Dry Husk Stage: 1= Upright 2= Horizontal 3= Pendant
5 Husk Tightness (Rate of Scale from 1=very loose to 9=very tight)
2 Husk Extension (at harvest): 1=Short (ears exposed) 2=Medium (<8 cm)
3=Long (8-10 cm beyond ear tip) 4=Very Long (>10 cm)

01 2.5GY86
02 5GY68
21 2.5Y8.54
2
5
2

7b. EAR (Husked Ear Data):

	Standard	Sample	Standard	Sample
	Deviation	Size	Deviation	Size
<u>17.0</u> cm Ear Length	<u>01.41</u>	<u>04</u>	<u>18.3</u> <u>01.50</u>	<u>04</u>
<u>44.3</u> mm Ear Diameter at mid-point	<u>00.96</u>	<u>04</u>	<u>36.8</u> <u>00.96</u>	<u>04</u>
<u>134.5</u> gm Ear Weight	<u>09.15</u>	<u>04</u>	<u>102.8</u> <u>03.50</u>	<u>04</u>
<u>16</u> Number of Kernel Rows	<u>00.50</u>	<u>04</u>	<u>11.0</u> <u>00.00</u>	<u>04</u>
<u>2</u> Kernel Rows: 1=Indistinct 2=Distinct			<u>2</u>	
<u>1</u> Row Alignment: 1=Straight 2=Slightly Curved 3=Spiral			<u>1</u>	
<u>09.0</u> cm Shank Length	<u>02.94</u>	<u>04</u>	<u>11.0</u> <u>00.82</u>	<u>04</u>
<u>2</u> Ear Taper: 1=Slight 2=Average 3=Extreme			<u>1</u>	

8. KERNEL (Dried)

	Standard	Sample	Standard	Sample
	Deviation	Size	Deviation	Size
<u>11.0</u> mm Kernel Length	<u>00.00</u>	<u>04</u>	<u>11.0</u> <u>00.00</u>	<u>04</u>
<u>08.3</u> mm Kernel Width	<u>00.50</u>	<u>04</u>	<u>08.8</u> <u>00.50</u>	<u>04</u>
<u>04.5</u> mm Kernel Thickness	<u>00.58</u>	<u>04</u>	<u>04.5</u> <u>00.58</u>	<u>04</u>
<u>17.8</u> % Round Kernels (Shape Grade)	<u>04.35</u>	<u>04</u>	<u>32.0</u> <u>09.00</u>	<u>03</u>
<u>1</u> Aleurone Color Pattern: 1=Homozygous 2=Segregating			<u>1</u>	
<u>07</u> Aleurone Color (Munsell code)	<u>1.25Y812</u>		<u>07</u> <u>10YR814</u>	
<u>07</u> Hard Endosperm Color (Munsell code)	<u>10YR714</u>		<u>07</u> <u>10YR714</u>	
<u>03</u> Endosperm Type:			<u>3</u>	
1=Sweet (Su1) 2=Extra Sweet (sh2) 3=Normal Starch				
4=High Amylose Starch 5=Waxy Starch 6=High Protein				
7=High Lysine 8=Super Sweet (se) 9=High Oil				
10=Other _____				
<u>26.3</u> gm Weight per 100 Kernels (unsized sample)	<u>00.50</u>	<u>04</u>	<u>30.50</u> <u>03.11</u>	<u>04</u>

9. COB:

	Standard	Sample	Standard	Sample
	Deviation	Size	Deviation	Size
<u>23.8</u> mm Cob Diameter at mid-point	<u>02.06</u>	<u>04</u>	<u>19.0</u> <u>00.82</u>	<u>04</u>
<u>14</u> Cob Color (Munsell code)	<u>10R46</u>		<u>14</u> <u>2.5YR56</u>	

10

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10. DISEASE RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested; leave Race or Strain Options blank if polygenic):

A. Leaf Blights, Wilts, and Local Infection Diseases

	Anthracnose Leaf Blight (<i>Colletotrichum graminicola</i>)	
5	Common Rust (<i>Puccinia sorghi</i>)	7
	Common Smut (<i>Ustilago maydis</i>)	
	Eyespot (<i>Kabatiella zeae</i>)	
	Goss's Wilt (<i>Clavibacter michiganense</i> spp. <i>nebraskense</i>)	
5	Gray Leaf Spot (<i>Cercospora zeae-maydis</i>)	4
	Helminthosporium Leaf Spot (<i>Bipolaris zeicola</i>) Race _____	
7	Northern Leaf Blight (<i>Exserohilum turcicum</i>) Race _____	7
8	Southern Leaf Blight (<i>Bipolaris maydis</i>) Race _____	7
3	Southern Rust (<i>Puccinia polysora</i>)	3
7	Stewart's Wilt (<i>Erwinia stewartii</i>)	6
	Other (Specify) _____	

B. Systemic Diseases

	Corn Lethal Necrosis (MCMV and MDMV)	
7	Head Smut (<i>Sphacelotheca reiliana</i>)	9
	Maize Chlorotic Dwarf Virus (MDV)	
	Maize Chlorotic Mottle Virus (MCMV)	
4	Maize Dwarf Mosaic Virus (MDMV)	3
	Sorghum Downy Mildew of Corn (<i>Peronosclerospora sorghi</i>)	
	Other (Specify) _____	

C. Stalk Rots

4	Anthracnose Stalk Rot (<i>Colletotrichum graminicola</i>)	4
	Diplodia Stalk Rot (<i>Stenocarpella maydis</i>)	
	Fusarium Stalk Rot (<i>Fusarium moniliforme</i>)	
	Gibberella Stalk Rot (<i>Gibberella zeae</i>)	
	Other (Specify) _____	

D. Ear and Kernel Rots

	Aspergillus Ear and Kernel Rot (<i>Aspergillus flavus</i>)	
5	Diplodia Ear Rot (<i>Stenocarpella maydis</i>)	3
5	Fusarium Ear and Kernel Rot (<i>Fusarium moniliforme</i>)	5
	Gibberella Ear Rot (<i>Gibberella zeae</i>)	
	Other (Specify) _____	

11

11. INSECT RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); (leave blank if not tested):

Banks grass Mite (Oligonychus pratensis)
 Corn Worm (Helicoverpa zea)
 Leaf Feeding
 Silk Feeding
 mg larval wt.
 Ear Damage
 Corn Leaf Aphid (Rhopalosiphum maidis)
 Corn Sap Beetle (Carpophilus dimidiatus)
 European Corn Borer (Ostrinia nubilalis)
 5 1st Generation (Typically Whorl Leaf Feeding)
 2nd Generation (Typically Leaf Sheath-Collar Feeding)
 Stalk Tunneling
 cm tunneled/plant
 Fall Armyworm (Spodoptera frugiperda)
 Leaf Feeding
 Silk Feeding
 mg larval wt.
 Maize Weevil (Sitophilus zeamaize)
 Northern Rootworm (Diabrotica barberi)
 Southern Rootworm (Diabrotica undecimpunctata)
 Southwestern Corn Borer (Diatraea grandiosella)
 Leaf Feeding
 Stalk Tunneling
 cm tunneled/plant
 Two-spotted Spider Mite (Tetranychus urticae)
 Western Rootworm (Diabrotica virgifera virgifera)
 Other (Specify) —

3

12. AGRONOMIC TRAITS:

5	Staygreen (at 65 days after anthesis) (Rate on a scale from 1=worst to excellent)	3
2.2	% Dropped Ears (at 65 days after anthesis)	0.0
	% Pre-anthesis Brittle Snapping	
	% Pre-anthesis Root Lodging	
0.4	Post-anthesis Root Lodging (at 65 days after anthesis)	0.0
4.667.1	Kg/ha Yield of Inbred Per Se (at 12-13% grain moisture)	2,137.1

13. MOLECULAR MARKERS: (0=data unavailable; 1=data available but not supplied; 2=data supplied):

1 Isozymes

0 RFLP's

0 RAPD's

COMMENTS (eg. state how heat units were calculated, standard inbred seed source, and/or where data was collected. Continue in Exhibit D):

CLARIFICATION OF DATA IN EXHIBITS B AND C

Please note the data presented in Exhibit C, "Objective Description of Variety," are collected primarily at Johnston, Iowa. The data in Exhibit B is from comparisons of inbreds grown in the same tests in the adapted growing area of PH21T and in Johnston, IA.

FEB 13/01

The data collected in exhibit C were collected in 1996 and 1997 for page 1 and 2. There are environmental factors that differ from environment to environment. The environments had different planting dates. Environmental temperature and precipitation differences during the vegetative and grain fill periods can impact plant and grain traits and be a source of variability. These data are based on 5 plants measured at each location. The variation between traits collected in different years is usually higher than variation between locations in a given year or within locations. Please see Table 3 for average temperature and rainfall information in 1996 and 1997.

9/8/03 52

Table 3. Temperature and Rainfall

TEMPERATURE

YEAR	MAY	JUN	JULY	AUG	AVERAGE
1994	59.8	70.7	71.9	69.0	67.9
1995	56.2	69.4	74.3	76.9	69.2
1996	56.2	69.3	71.3	70.5	66.8
1997	53.5	70.6	74.1	69.6	67.0
1998	64.7	66.6	74.8	73.5	69.9
1999	60.7	69.7	78.7	70.5	69.9

RAINFALL

YEAR	MAY	JUN	JULY	AUG	Total
1994	3.67	5.75	1.71	4.18	15.31
1995	5.04	4.19	2.94	2.87	15.04
1996	8.47	4.35	2.51	2.14	17.47
1997	4.32	3.27	4.10	1.36	13.05
1998	6.46	11.07	5.70	4.96	28.19
1999	6.46	4.54	4.45	6.55	21.85

14

**Exhibit D. Variety 1 = PH21T
Variety 2 = PHR03**

	BU	MST	TST	SDG	TIL	GDG	POI	TAS	RT	STK	BRT	SCT	BAR	DRP	GRN	TPX	EAR	TAS	ECB	GIF	
VAR	ACR	WT	VGR	SHD	SLK	WT	SC	S2	LDG	LDG	STK	GRN	SZ	PLT	EAR	APP	EAR	MILD	WT	HTF	
YEAR	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ADS	ADS	ADS	ADS	ADS	ADS							
95	1	51.8	19.3	60.2	5.9	1.1	1505.0	1533.0	5.6	5.8	87.0	94.0	98.5	5.7	6.0	94.4	6.5	6.5	5.3	6.5	
	2	68.9	19.2	57.5	5.5	1.4	1531.0	1577.0	7.8	6.6	67.6	92.0	94.4	5.7	7.0	98.2	6.5	7.0	5.3	4.5	
LOCs	8	10	8	15	17	22	22	22	5	10	4	1	3	4	12	4	4	4	4		
REPS	9	11	9	17	18	22	22	22	5	10	4	2	4	3	4	13	4	4	4		
PROB	0.22	0.872	.001#	0.169	0.81	.010+	.000#	.020+	.022+	.081*	.020+	.0468	.016	.0182	.0182	.0316	.016+				
96	1	64.1	29.1	55.0	4.7	0.6	1517.0	1531.0	5.3	5.6	100.0	88.2	100.0	7.3	5.0	87.7	97.9	6.0	6.5	5.8	
	2	53.3	28.3	52.6	5.2	0.8	1534.0	1571.0	5.0	6.0	95.0	98.6	100.0	5.7	7.0	85.2	100.0	6.7	6.0	9.0	
LOCs	3	3	3	12	19	35	34	34	3	17	1	3	1	3	1	7	2	3	2	1	
REPS	3	3	3	12	19	35	34	34	3	17	1	3	1	3	1	7	2	3	2	1	
PROD	0.531	0.78	0.255	.010+	0.678	.075*	.001#	.0667	.0231	0.667	0.231	0.405	0.3	0.866	0.5	0.539	0.5	.056*			
97	1	82.2	14.9	65.5	5.2	2.7	1526.0	1558.0	153.4	6.3	99.5	100.0	7.0	6.0	98.1			6.5	6.5	6.0	
	2	71.2	15.2	62.2	5.9	0.6	1555.0	1589.0	165.6	7.0	100.0	100.0	7.8	7.0	98.2			8.0	8.0	4.9	
LOCs	4	4	4	11	8	22	22	22	4	6	4	1	4	1	3		2	2	4	6	
REPS	4	4	4	11	8	22	22	22	4	6	4	1	4	1	3		2	2	4	11	
PROB	0.506	0.594	0.24	.004#	0.188	.002#	.001#	.058	.0102	0.391		0.215		0.423			0.205	0.5	.011+	.010+	
TOTAL	1	62.4	20.0	60.5	5.3	1.2	1516.0	1539.0	153.4	5.5	5.8	94.0	89.7	99.1	6.7	5.8	92.8	97.9	6.3	6.5	
SUM																		6.1	4.2	5.0	
	2	66.4	19.8	57.8	5.5	1.0	1539.0	1578.0	165.6	6.8	6.4	85.1	96.9	96.7	6.5	7.0	94.1	100.0	6.6	7.0	
LOCs	15	17	15	38	44	79	78	4	8	33	9	4	5	10	6	22	2	7	8	7	
REPS	16	18	16	40	45	79	78	4	8	33	9	5	6	10	6	23	2	7	8	7	
DIFF	4	0.1	2.8	0.2	0.2	23	39	12.2	1.3	0.5	8.9	7.3	2.4	0.2	1.2	1.3	2.1	0.3	0.5	0.6	
PROB	0.649	0.8	.001#	0.239	0.756	.000#	.000#	.058	.083*	.005#	.085*	.0412	.0417	.0705	.034+	.0744	.0.5	0.522	.0.17	.0457	.011+

15

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICEEXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) PIONEER HI-BRED INTERNATIONAL, INC.	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME PH21T
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 7301 NW 62nd AVENUE P.O.BOX 85 JOHNSTON, IA 50131-0085	5. TELEPHONE (include area code) 515-270-4051	6. FAX (include area code) 515-253-2125
	7. PVPO NUMBER 9801354	

8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain. YES NO9. Is the applicant (individual or company) a U.S. national or U.S. based company? YES NO

If no, give name of country

10. Is the applicant the original owner? YES NO If no, please answer one of the following:

a. If original rights to variety were owned by individual(s), is(are) the original owner(s) a U.S. national(s)?

 YES NO If no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

 YES NO If no, give name of country

11. Additional explanation on ownership (if needed, use reverse for extra space):

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See section 41(a)(2) of the Plant Variety Protection Act for definition.

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